REMARKS

Claims 1-42 stand rejected under 35 USC §112, first paragraph, "as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains . . . to make and/or use the invention." (Office Action at 2). In particular, the Office Action contends that "it is not clear what Applicant meant by 'forming a plurality of first conductive layers *in* an insulating layer of a substrate.'" (Office Action at 2). Reconsideration is respectfully requested. Independent claim 1 has been amended to recite "forming a plurality of first conductive layers over an insulating layer formed over a substrate." Independent claim 21 has also been amended to recite "forming a plurality of first conductive layers over an insulating layer formed over a substrate." These amendments are fully supported by the original specification and drawings, and there is no new matter. As described in the original specification, "[r]eferring now to Figure 3, an insulating layer 54 is formed over the substrate 50." (Specification at 8, paragraph 0034). As also described in the specification, "a conductive material layer 60 is formed over the barrier layer 59 and the insulating layer 54." (Specification at 10-11, paragraph 0039). Accordingly, the specification provides enabling support for the amendments to the claims.

The Office Action asserts that "Applicant meant forming the conductive layers in trenches formed in the insulating layer." (Office Action at 2). Applicant notes that claims 1-42, as amended, are drawn to forming a plurality of first conductive layers over an insulating layer formed over a substrate. The claims are not limited to methods in which conductive layers are formed in trenches.

The Office Action also asserts that "it is not clear what Applicant meant by 'forming an insulating material in between and over said first and second magnetic layers.'" (Office Action at 3). Please note that claim 1 has been amended to recite "forming an insulating material in between each said plurality of first magnetic layers, in between each said plurality of second magnetic layers and over both said first and second magnetic

layers." Independent claim 21 has also been amended to recite "forming an insulating material over said substrate, over both said plurality of first and second magnetic layers including said top conductive layers, and in between each said plurality of first magnetic layers and each said plurality of second magnetic layers." The scope of the claims should be determined according to the actual language of the amended claims, not as proposed in the Office Action.

In a preferred embodiment, each MRAM structure 100 includes a "pinned layer 91 (as part of the first magnetic member 79)" and a "sense layer 92 (as part of the second magnetic member 89)." (Specification at 13-14, paragraph 0046). The "insulating layer 95 (Figure 17) is formed overlying the substrate 50 including the MRAM structures 100." (Specification at 14-15, paragraph 0048). In this manner, "insulating layer 95 completely fills the spaces between any adjacent MRAM structures 100." (Specification at 14-15, paragraph 0048; Figure 17). As shown in Figure 17, for example, insulating layer 95 acts as an insulating material over both the plurality of first and second magnetic layers, and in between each plurality of first magnetic layers and each plurality of second magnetic layers. Please note, however, that the claimed invention should not be limited to the embodiments shown and described in detail in the specification.

The Office Action further asserts that "it is not clear what Applicant meant by 'removing portion of said insulating material to expose at least one upper surface of a conductive layer, said conductive layer being part of said second magnetic layer." (Office Action at 3). In response to this concern, claim 1 has been amended to recite "each of said plurality of second magnetic layers comprising a top conductive layer" and "removing portion of said insulating material to expose at least one upper surface of said second magnetic layers," and claim 21 has been amended to recite "removing portions of said insulating material to expose at least one upper surface of said conductive layer."

As detailed in the specification and as illustrated in Figures 17 and 18, for example, "subsequent to the formation of the insulating layer 95 (Figure 17), portions of the insulating layer 95 that are formed over the top surface of the MRAM structures 100

are removed by means of chemical mechanical polishing (CMP) or well-known RIE dry etching processes." (Specification at 15, paragraph 0049). The specification further explains that, "the insulating layer 95 is chemical mechanical polished so that an [abrasive] polish removes the top surface of the insulating layer 95 above the MRAM structures 100." (Specification at 15, paragraph 0049). The polish is removed "down to or near the planar surface of the top surface of the conductive layer 85, to form respective self-aligned MRAM contacts 99 in a polished insulating layer 96." (Specification at 15, paragraph 0049). In this manner, "the conductive layer 85, which was formed as part of the sense layer 92 of the MRAM structure 100, acts as a polishing stop layer in the formation of the self-aligned contacts 99." (Specification at 15, paragraph 0049).

Claims 1-42 stand rejected under 35 U.S.C. 102(e) as being anticipated by Sandhu et al. (U.S. Patent No. 6,358,756 B1) ("Sandhu"). This rejection is respectfully traversed.

The claimed invention relates to a method of forming contacts in magnetic random access memory cells. Amended independent claim 1 recites the steps of "forming an insulating material in between each said plurality of first magnetic layers, in between each said plurality of second magnetic layers and over both said first and second magnetic layers" and "removing portion of said insulating material to expose at least one upper surface of said conductive layer."

Sandhu relates to a method of fabricating a MRAM structure and a self-aligned, magnetoresistive random-access memory (MRAM) structure utilizing a spacer containment scheme. Sandhu teaches "a spacer processing technique, whereby the upper magnetic layer of the MRAM stack structure is formed between the region defined by the spacers, thereby allowing for self-alignment of the upper magnetic layer over the underlying pinned magnetic layer."

Sandhu fails to teach or suggest "forming an insulating material in between each said plurality of first magnetic layers, in between each said plurality of second magnetic layers and over both said first and second magnetic layers," as amended independent claim

1 recites. Sandhu also fails to teach or suggest "forming an insulating material over said substrate, over both said plurality of first and second magnetic layers, and in between each said plurality of first magnetic layers and each said plurality of second magnetic layers," as amended independent claim 21 recites. Sandhu teaches the formation of second (24), third (32) and fourth (38) insulating layers (col. 5, lines 54-59; col. 6, lines 1-11; Figure 5); however, none of these insulating layers are formed "over both said plurality of first and second magnetic layers" and "in between each said plurality of first magnetic layers and each said plurality of second magnetic layers", as in the claimed invention. As illustrated in Figure 5 of Sandhu, insulating layer 24 is not formed "over" M2 layer 28. Similarly, insulating layers 32 and 38 are not formed "in between" adjacent M1 and M2 layers 20, 28.

Sandhu also fails to teach or suggest "removing portion of said insulating material to expose at least one upper surface of said conductive layer," as amended independent claim 1 recites, or "removing portions of said insulating material from said top conductive layers to expose a plurality of upper surfaces of said top conductive layers associated with said second magnetic layers," as amended independent claim 21 recites. Sandhu teaches that M2 layer 28 is formed within areas defined by spacers 26 and over layer 22. (Column 5, lines 32-40; Figure 4). Sandhu also teaches that tantalum barrier layer 30 is formed over the M2 layer 28 (column 5, lines 40-52; Figure 4), but not as an upper surface of the M2 layer 28, which would arguably correspond to the second magnetic layer of the claimed invention. Sandhu teaches insulating layers 24, 32 and 38 (column 5, lines 54-60; column 6, lines 1-10), but Sandhu fails to teach or suggest removing portion of insulating material "to expose at least one upper surface" of the M2 layer 28. For at least these reasons, Sandhu fails to disclose all limitations of claims 1-42, and withdrawal of the rejection of these claims is respectfully requested.

A marked-up version of the changes made to the claims by the current amendment is attached. The attached page is captioned "**Version with markings to show changes made.**"

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

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Respectfully submitted,

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Version With Markings to Show Changes Made

1. (amended) A method of forming at least one contact in a magnetic random access memory cell structure, said method comprising:

forming a plurality of first conductive layers <u>over</u> [in] an insulating layer [of] <u>formed over</u> a substrate;

forming a plurality of first magnetic layers over said [respective] first conductive layers;

forming a plurality of second magnetic layers <u>over</u> [spaced along] said first magnetic layers<u>, each of said plurality of second magnetic layers comprising a top conductive layer</u>;

forming an insulating material in between [and over] <u>each said plurality of first</u> [said first] <u>magnetic layers,</u> [and] <u>in between each said plurality of</u> second magnetic layers <u>and over both said first and second magnetic layers</u>; and

removing portion of said insulating material to expose at least one upper surface of [a conductive layer,] said conductive layer [being part of said second magnetic layers].

21. (amended) A method of forming a plurality of self-aligned contacts <u>in</u> [of] respective magnetic random access memory <u>cell structures</u> [cells formed over a semiconductor substrate], said method comprising:

forming a plurality of first conductive layers <u>over</u> [in] an insulating layer formed over <u>a</u> [said semiconductor] substrate;

forming a plurality of first magnetic layers over <u>said</u> [respective] first conductive layers;

forming a plurality of second magnetic layers <u>over</u> [spaced along] said first magnetic layers said plurality of second magnetic layers including respective top conductive layers;

forming an insulating material over said substrate, [and] over both said plurality of first and second magnetic layers including said top conductive layers, and in between [adjacent first and second magnetic layers] each said plurality of first magnetic layers and each said plurality of second magnetic layers;

removing portions of said insulating material from said top conductive layers to expose a plurality of upper surfaces of said top conductive layers associated with said second magnetic layers; and

forming a plurality of second conductive layers over respective self-aligned contacts, said second conductive layers running substantially orthogonal to said first magnetic layers[;], one of said first and second conductive layers being bit lines and the other of said first and second conductive layers being word lines.